We claim:

1. A temperature compensated apparatus for filtering light comprising:

a holographically recorded grating defined in a photosensitive layer for providing optical filtration for light incident on the grating with a predetermined angle of incidence; and

angulation means responsive to temperature for tilting relative to the angle of incidence of the light with respect to the grating as a function of temperature of the grating so that changes in the filtration by the grating compensate for changes in temperature of the grating to maintain effective filtration of the light approximately constant.

2. The apparatus of claim 1 where the angulation means comprises a bimetallic strip having a differential thermal expansion coefficient and wherein light is reflected from or by means of the strip at the predetermined angle of incidence, the differential thermal expansion coefficient of the strip being selected to vary the curvature of the strip and hence the angle of incidence of the light by a degree approximately corresponding to the shift in filtration response of the grating as a function of temperature so that Bragg filtration provided by the grating is approximately independent of temperature of the grating.

3. The apparatus of claim 2 where the bimetallic strip is comprised of a aluminum and silicon composite.

4. The apparatus of claim 1 where the grating is characterized by a Bragg wavelength, $2n \Lambda \cos \theta_{in} = \lambda_B(T)$ where n is the index of refraction of the bulk material of the layer, Λ is the period of the grating, θ_{in} is the internal angle of the incident light within the layer and $\lambda_B(T)$ is the Bragg wavelength as a function of temperature of the grating, T, the angulation means changing θ_{in} of the light to approximately match the change in Bragg wavelength $\lambda_B(T)$ for a change in temperature, ΔT.

5. The apparatus of claim 4 where the Bragg wavelength $\lambda_B(T)$ is determined by a 0.5 dB criterion.

6. The apparatus of claim 1 where the angulation means changes the angle of incidence of the light according to

$$\frac{\cos(\theta_B + \Delta\theta)}{\cos\theta_B} = \frac{1}{(1+a\Delta T)(1+b\Delta T)}$$

where ΔT is the change in temperature of the grating, where a is the thermal expansion coefficient of the layer, where b is the thermal coefficient of the dielectric constant and hence the index of refraction of the layer, where θ_B is the Bragg angle corresponding to a target wavelength for filtration when $\Delta T = 0$, and

where $\Delta\theta_B$ is the change in the Bragg angle made to compensate to the temperature change ΔT.

7. A method for temperature compensating a Bragg filter comprising:

providing a holographically recorded grating defined in a photosensitive layer for providing optical filtration;

directing light incident on the grating at a predetermined angle of incidence; and

controlling the angle of incidence of the light relative to the grating in response to temperature changes in the grating so that filtration by the grating compensates for changes in temperature of the grating to keep effective filtration approximately constant.

8. The method of claim 7 where controlling the angle of incidence of the light relative to the grating comprises:

reflecting the light from a bimetallic strip having a differential thermal expansion coefficient onto the grating; and

varying the curvature of the strip and hence the angle of incidence of the light onto the grating to the shift the Bragg filtration of the grating according to the change in temperature so that effective filtration provided by the grating is approximately independent of temperature of the grating.

9. The method of claim 8 where reflecting the light from a bimetallic strip reflects the light from a strip comprised of a aluminum and silicon composite.

10. The method of claim 7 where the grating is characterized by a Bragg wavelength, $2n \Lambda \cos \theta_{in} = \lambda_B(T)$ where n is the index of refraction of the bulk material of the layer, Λ is the period of the grating, θ_{in} is the internal angle of the incident light within the layer and $\lambda_B(T)$ is the Bragg wavelength as a function of temperature of the grating, T, and where controlling the angle of incidence of the light relative to the grating changes θ_{in} of the light to approximately match the change in Bragg wavelength $\lambda_B(T)$ for a change in temperature, ΔT.

11. The method of claim 10 further comprising determining the Bragg wavelength $\lambda_B(T)$ by a 0.5 dB criterion.

12. The method of claim 7 where controlling the angle of incidence of the light relative to the grating changes the angle of incidence of the light according to

$$\frac{\cos(\theta_B + \Delta\theta)}{\cos\theta_B} = \frac{1}{(1 + a\Delta T)(1 + b\Delta T)}$$

where ΔT is the change in temperature of the grating, where a is the thermal expansion coefficient of the layer, where b is the thermal coefficient of the dielectric constant and hence the index of refraction of the layer, where θ_B is the Bragg angle corresponding to a target wavelength for filtration when $\Delta T = 0$, and

where $\Delta\theta_B$ is the change in the Bragg angle made to compensate to the temperature change ΔT.

13. A temperature compensated apparatus for filtering light comprising:

a holographic filter defined in a photosensitive layer of iron doped $LiNbO_3$ for providing optical filtration for light incident with a predetermined angle of incidence at a Bragg wavelength defined at the middle of a bandwidth of transmittance through the filter; and

angulation means responsive to temperature for tilting the relative angle of incidence of the light as a function of temperature with respect to the filter so that changes in the filtration compensate for changes in temperature of the filter to maintain effective filtration approximately constant.

14. The apparatus of claim 13 where the angulation means comprises a mirror coupled to a bimetallic composite strip.

15. The apparatus of claim 14 where the mirror comprises a MEMS mirror.

16. The apparatus of claim 15 where the MEMs mirror is comprised of a mirror portion including a gold film deposited on silicon and a beam of aluminum deposited on silicon which deflects as temperature varies.

17. The apparatus of claim 15 further comprising a second MEMs mirror optically coupled to the filter to correct for walk-off to allow coupling with an optic fiber.

18. The apparatus of claim 13 where the angulation means is annealed to reduce hysteresis.

19. The apparatus of claim 1 where the angulation means is annealed to reduce hysteresis.

20. The apparatus of claim 1 where the angulation means and the grating are thermally coupled to each.